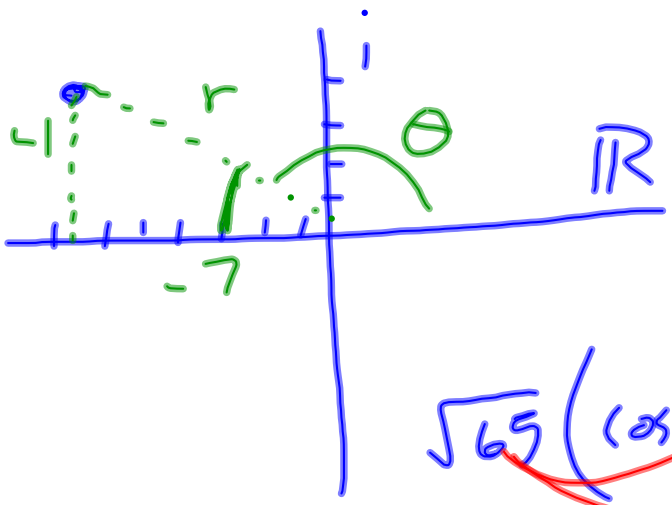
p. 456) $z = r(\cos\theta + i\sin\theta)$

25 $-7 + 4i$



$r = \sqrt{65}$

$\tan\theta = \frac{4}{-7}$

$\theta = -29.7^\circ$

$\theta \approx 150.3^\circ$

$\sqrt{65}(\cos 150.3^\circ + i\sin 150.3^\circ)$

2.6

6-5 Multiplying and Dividing Complex Numbers

$z_1 = 3 + 2i$

$z_2 = -5 + 7i$

$(3+2i)(-5+7i)$

$\frac{3+2i}{-5+7i}\left(\frac{-5-7i}{-5-7i}\right)$

$$z_1 = r_1(\cos\theta_1 + i\sin\theta_1)$$
$$z_2 = r_2(\cos\theta_2 + i\sin\theta_2)$$

$$z_1 z_2 = r_1 r_2\left[\cos(\theta_1 + \theta_2) + i\sin(\theta_1 + \theta_2)\right]$$
$$\frac{z_1}{z_2} = \frac{r_1}{r_2}\left[\cos(\theta_1 - \theta_2) + i\sin(\theta_1 - \theta_2)\right]$$

Ex 1 $z_1 = 2\left(\cos\frac{2\pi}{3} + i\sin\frac{2\pi}{3}\right)$
$z_2 = 8\left(\cos\frac{11\pi}{6} + i\sin\frac{11\pi}{6}\right)$

Find $z_1 z_2$ Write the answer in trigonometric and standard form.

$z_1 z_2 = 16\left(\cos\frac{5\pi}{2} + i\sin\frac{5\pi}{2}\right)$

$16\left(\cos\frac{\pi}{2} + i\sin\frac{\pi}{2}\right)$

$16i$

Ex 2 $z_1 = 24(\cos 300° + i \sin 300°)$

$z_2 = 8(\cos 75° + i \sin 75°)$

Find $\frac{z_1}{z_2}$ Write the answer in trigonometric and standard form.

$\frac{z_1}{z_2} = 3(\cos 225° + i \sin 225°)$

$-2.1 + -2.1i$

Ex 3 Find z^2

$z = r(\cos\theta + i \sin\theta)$ $\cdot\ r(\cos\theta + i \sin\theta)$

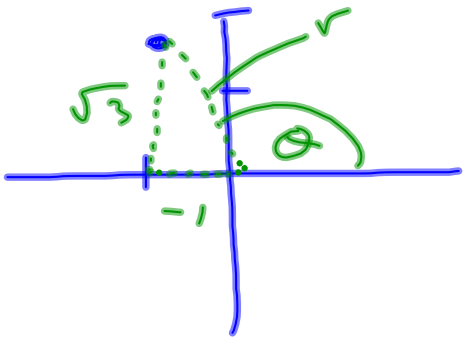
$z^2 = r^2(\cos 2\theta + i \sin 2\theta)$

DeMoivre's Theorem -

If $z = r(\cos\theta + i\sin\theta)$

Then $z^n = r^n(\cos n\theta + i\sin n\theta)$

Ex 4 Find $\left(-1+\sqrt{3}i\right)^{12}$

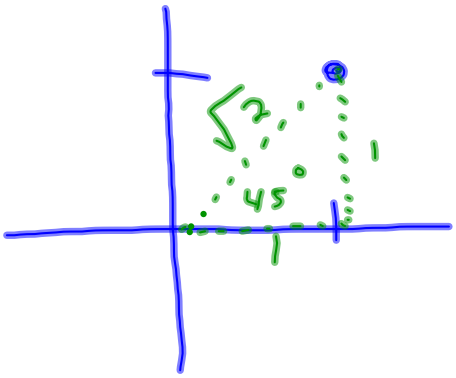


$2(\cos 120^\circ + i\sin 120^\circ)$

$2^{12}(\cos 1440^\circ + i\sin 1440^\circ)$

4096

Ex 5 Find $(1+i)^8$



$\sqrt{2}^8(\cos 8(45°)+i\sin 8(45°))$

$16(\cos 360° + i\sin 360°)$

$\boxed{16}$

Homework
p.457
#55-65, 91-93 odds